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ABSTRACT

This paper briefly reviews studies pertaining to the imitation of facial gestures in early infancy. It is suggested that imitation provides for the initiation of a reciprocal exchange between mother and infant, but does not sustain such an interaction, since this requires a continually varied and changing pattern of gestures. Thus there is an initial imitation of gestures in infants, followed by a regular decline. (CM)

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IMITATION IN EARLY INFANCY

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Over the past 100 years there have been a number of reports of the imitation of facial gestures by infants in the first three months of life. Such reports, often by psychologist parents of their own children, have, in almost all instances, been followed by doubts about whether such a phenomenon is possible. Consider the infant in the first month of life looking out at the world and seeing, as it is usually supposed, some pattern of contrasts between light and dark, perhaps movement and possibly color but hardly a world made up of stable objects, ranged in a three dimensional space. Piaget (1937) has spoken about "tableaux" which come and go as the infant moves his eyes and head; Salapatek (1975) of the complexity of contour elements, not yet conforming to the Gestalt principles of proximity, similarity or good continuation. Now suppose that we present the neonate with what we know to be a living face and a tongue which protrudes. The infant's eyes are attracted, let us say, by the movement of the visual stimulus, and as he looks, he starts to move his mouth and then, distinctly opens his mouth and sticks out his tongue. Given our picture of the infant's visual world, it hardly seems feasible to assume that the infant has located a three dimensional object (the head,) has fixated one part of that object (mouth and tongue,) has noted the movement and, then, that he has identified what he saw with a part of his own body which he has never seen (his own mouth and tongue) and, finally, that he has repeated this observed movement. Interesting as this observation of tongue protrusion may be one can hardly expect that an experienced psychologist would identify this sequence with what we

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would later call an imitative act.

Let me cite simply one instance of this confrontation between psychologist and infant to illustrate a variety of expert reactions. Zazzo, a well-known French psychologist who is noted for his work on the testing of infants and children starts off an article (Zazzo, 1957) in the following way:

"It was entirely by chance and without any concern for experimentation that I observed in my son, aged 25 days, a reaction which was to unsettle all my ideas on the mechanism and the origins of imitation.

From the day of his birth I had carefully noted his bodily activities, his reactions, not only avoiding the introduction of anything which might constitute an artificial experience, but also trying to forget that body of received knowledge which might blind the observer to any novelty. My rule was to protect the infant's spontaneous reactions and, what is much more difficult, to preserve the naiveté of my observations.

Thus I had no intention of provoking imitation, which I hardly believed possible at his age. Playing with my son on this particular day, I amused myself by sticking out my tongue at him. To my great astonishment, the baby stuck out his tongue at me in return. I began again. He responded. This occurred several times."

Zazzo repeated his experiment on his son and even called in several colleagues to verify the phenomenon. Then, still doubting that what he observed was imitation (perhaps it was the infant who had initiated this exchange and the imitation was really that of the adult) he asked several collaborators to try the same experiment

with other infants. In a series of verbatim notes, he documents a number of cases of tongue imitation by infants younger than one month of age.

I have used Zazzo as an example, but there are numerous other instances of infant imitation noted by such careful observers as Preyer (1882), Stern (1914), Guillaume (1925), Valentine (1930), Piaget (1945), Gardner and Gardner (1970). In each case there was some attempt to control for the sorts of variables that Zazzo had been concerned with, possibilities of subtle cues that might be operating to elicit the behavior along with reinforcements independent of the simple presence of the model. While each of the authors doubts that the infant is truly imitating, while each shares something of the incredulous response of Zazzo, no adequate explanation of the phenomenon has been forthcoming.

In general these and other authors have assumed that imitation, which involves the recognition of the other as in some sense comparable to self, must arise gradually out of some chance correspondence between the behavior of the infant and the behavior of the model. Baldwin, (1895), Piaget (1945), Uzgiris (1972), have spoken of a circular reaction such that the infant first learns to imitate his own activity and only later comes to identify the behavior of the model as something distinct from his own behavior. Gewirtz (Gewirtz and Stingle, 1968), Miller and Dollard (1941), Mowrer (1960) have assumed that, initially there is a reinforcement of behaviors that happen to coincide with that of the model and that such a learned pattern becomes generalized to encompass what we ordinarily call imitation.

A recent study by Meltzoff and Moore (1977) puts these theoretical accounts to rest and finally affirms, under controlled experimental

conditions, what the anecdotal evidence had affirmed before, that infant imitation of bodily activities does exist, in its own right, and cannot be explained by some form of conditioned learning. In the first of two studies they present 6 infants, aged 12-17 days, with four different models: mouth opening, tongue protrusion, lip protrusion (pursing of the lips) and sequential finger movement. They submitted the videotapes of the infants' responses to raters who knew what models had been shown but who had no idea of which model went with which tape. The raters were able in each case to pick out the infant films that went with the correct model, with P values of from .05 to .001. However, there was a weakness in their design since it was sometimes necessary to repeat the modeled activity if the infant was not looking and it was possible that the experimenter might have been biasing the results by repeating the presentation until the random behavior of the infant coincided with that of the model.

In a second experiment, two behaviors, mouth opening and tongue protrusion were administered to 12 infants, 16-21 days of age. Added controls were introduced by having the infants suck on a pacifier during the presentation period so that there would be no opportunity for the experimenter to be responding to the infant's gestures. Following the presentation of the model, the pacifier was removed and a long 24 minute response period followed, during which the model's face remained unexpressive. Raters scored these films for the presence or absence of tongue and mouth gestures, without knowing which model had been presented to the infant. Comparisons of scored gestures in a control and two experimental periods indicated a predominance of the expected gesture, tongue being significant at the .005 level, mouth at the .05 level.

Meltzoff and Moore confirm, under experimental conditions, what numerous other psychologists have observed under poorly controlled conditions. Infants in the first and second month of life are able to imitate gestures presented by an adult model. Thus we have a strong confirmation of the existence of imitation in the young infant, despite the more usual interpretation of perceptual naiveté held by a wide variety of infant psychologists.

Meltzoff and Moore's study raises a variety of interesting questions about the social nature of infancy which will undoubtedly be explored through future research. However, it also lends a legitimacy to the many informal findings on early infant imitation, despite the confusion of interpretations which they fostered. I propose that we consider two aspects of imitation which can be extracted from the earlier studies which may help in thinking out the potential significance of imitation. First let us consider the nature of the imitated acts, to see what light they shed on the possible functions of such imitation; secondly, I suggest that we examine a peculiarity of imitation during the early months which is widely confirmed - the fact that it shows a decline during the first six months of life and a recrudescence only after 7 months.

1. The following behaviors have been observed to be imitated by the infant in the first three months of his life: mouth opening, lip pursing, tongue protrusion, head nodding, vocalization (often without reference to phonemic accuracy,) hand and finger movements. All of these movements constitute potential or actual gestures which mothers use in interacting with the infant.

Brazelton, Koslowski and Main (1974) have recently provided exciting documentation of the existence during the early

months of the infant's life of a gestural exchange that takes place between mother and infant, the mother providing a paced sequence of activities which seem to lead the infant on to ever more complicated interactions. This reciprocal exchange seems to develop within the first six weeks of life, changing its character from month to month up until the 7th or 8th month, after which a vocal exchange partially replaces it. While there have been no firm interpretive accounts of the function of such an exchange, it is my hunch that it plays a significant role in preparing the infant for the learning of language.

Imitation may well be a factor in the initiation of this exchange of gestures, since it is a common observation that infant and adult characteristically enter into mutual imitation such that it soon becomes unclear who is imitating whom. (Recall Zazzo's initial uncertainties in this regard.) If we suppose that the gestural communication observed by Brazelton and by others (Stern 1974, Richards, 1971,) plays some essential role in the development of the child, it would make sense also to suppose that imitation could provide for the initial elicitation of some of these gestures and that mutual imitation could be one form of the gestural exchange.

2. Almost all authors who have observed imitation over a period of time have noted that it declines and becomes increasingly rare after the first few months. This decline of imitation does not seem so much to be a systematic decline, such as is found in a number of reflex behaviors, but rather is haphazard or sporadic. Judith and Howard Gardner (1970), for instance, found indications of tongue and mouth imitation in their six-week-old child, but the imitation lasted only for about a week. They say "attempts to repeat this

experiment in the following weeks were not successful. Apparently the infant tired of this particular game." (p. 1213.) Piaget also notes "a period of latency" in the vocal imitations of his daughter Jacqueline and Marats (1973), studying a group of 12 infants, notes a regular decline in imitation, varying somewhat with different gestures.

Returning to the matter of the gestural exchange, Bower (1974) notes that infants, even of a very young age, seem amenable to operant conditioning and are reinforced by a changing pattern of social inputs rather than a fixed social response. (See, for instance, Watson's analysis of what he calls "the game", Watson, 1966.) It is as though infants were interested in sequences of changing social responsivity in their partner, a learning pattern which might well foster the gestural exchange noted by Brazelton et al. (1974.) Imitation, as I have been considering it, lends itself to mutual imitative exchange, the infant imitating the mother and the mother, in turn, imitating the infant. But such an exchange lacks the variety which has been postulated as a necessary component of reinforcement. It is as though the infant signals that a repeated gesture which does not lead to a variation in the reciprocal exchange becomes boring. The infant becomes habituated to the visual input and "tires of the game," as the Gardner's say. The decline of imitation, so regularly noted, may thus be due to the lack of variation which is inherent in the activity. Imitation, then, may act to initiate an exchange, to introduce a new gesture into the give and take between mother and infant. However, it does not sustain such an interaction and thus tends to drop out as an imitated response.

To summarize: given the remarkable fact of imitation in early infancy, it is incumbent on us to consider how such a pattern plays a role in the normal developmental sequences of the infant's life. I have suggested that imitation provides for the initiation of a reciprocal exchange between mother and infant but that it does not sustain such an interaction, since this requires a continually varied and changing pattern of gestures. Thus, the picture that we see is that of initial imitation of gestures, followed by a regular decline.

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